

**Conduct an Adaptive Management
Experiment to Use Wetlands to Treat Colusa
Basin Drain Water Entering the Yolo Bypass
via the Knights Landing Ridge Cut**

Olen C. Zirkle

Public Comments

No public comments were received for this proposal.

Technical Synthesis Panel Review

Proposal Title

#0351: Conduct an Adaptive Management Experiment to Use Wetlands to Treat Colusa Basin Drain Water Entering the Yolo Bypass via the Knights Landing Ridge Cut

Final Panel Rating
inadequate

Technical Synthesis Panel (Primary) Review

TSP Primary Reviewer's Evaluation Summary And Rating:

This is a proposal with a good idea as the basis, but more attention needs to be paid to the detail of gathering data. The monitoring time frame is too short to provide meaningful data. There needs to be more thought given to sampling design, replication, and how these data will lead to Adaptive Management. How will municipalities use this information to help them with their water quality problems? If this a prototype for more wetlands than this is important? More attention needs to be directed toward these questions. Are there long-term (longer than 3 years) plans to monitor this site? There is much literature available on monitoring wetlands receiving agricultural water, e.g. The Everglades examples, and on sampling design. This is not as easy as it might seem and the authors should take advantage of available work. The proposal suffered from lack of technical acuity.

Additional Comments:

At the end of the project there will be a constructed wetland that could potentially be monitored longer to get useful information. It is unlikely that patterns of bird use and removal rates will be useful for any long-term understanding of how constructed wetlands will function unless the

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monitoring is both expanded in time and scope. Not clear how the results of the project would be used to answer the questions asked by municipalities looking for ways to insure clean drinking water.

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Technical Synthesis Panel (Discussion) Review

TSP Observations, Findings And Recommendations:

The underlying goals and objectives of this proposal are meritorious. However, the external technical reviewers were not supportive of this proposal and neither was the panel. This proposal has numerous technical shortcomings. For example, the time frame for evaluating the ecological outcome of constructed wetlands is far too short - the applicants propose to construct, monitor, and evaluate wetlands within a three-year period, but monitoring should probably continue for over a decade in order to get a true image of the wetlands impact on water quality. The proposed evaluation methods are insufficient as they have a limited number of treatment/control replicates. It is also unclear how the results of this project will feed back into the management objective: improving water quality. This is a demonstration project.

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In order to convince reviewers that the project team is up to this job, the project applicants are encouraged to utilize and acknowledge (i.e., cite) relevant literature on the topics they are addressing. For example, there is a wealth of literature on statistical and methodological aspects of monitoring ecosystem restoration projects. The applicants could benefit from, and are encouraged to, partner with institutions and researchers who have experience in this kind of monitoring. Such a partnership would result in improved monitoring design and protocols and evaluation of monitoring results. Only when such results are available will adaptive management be useful.

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Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	The goal of the proposed work is to use an experimental treatment wetland to treat Colusa Basin Drain water in the northern Yolo Bypass. While not specifically listed as a potential study topic for the Science Program 2004, it does fall within the listed categories (e.g. processes controlling water quality), and is an interesting research goal. A list of 14 project objectives is also given. Some of these fit the stated goal of the project and the described research to be conducted, but many others seem very broad. A more focused list of objectives would be more useful. A list of hypotheses is also given, but this raises some concerns. Although the authors state that their "hypothesized effectiveness and limitations of treatment wetlands" are "based on scientific literature", no scientific literature is cited anywhere in the proposal. Thus, included statements such as "water loss can be on the order of 25%" or "copper and chromium reduction is on the order of 50%" are meaningless, as they can't be put into any context.
Rating	fair

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection

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of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	The justification section is one of the weakest parts of this proposal. Although the authors make broad statements such as "there is an extensive body of scientific study, experience and literature on the sue of wetlands to treat point and nonpoint pollution sources", the authors do not cite a single scientific study! There is no indication that the authors understand how treatment wetlands work, the mechanisms by which pollutants are removed, or even which pollutants they are specifically targeting in their region. A conceptual model for the project is also lacking. Although Fig. 1 is labelled as a conceptual model, it is merely a model of a wetland. It does not illustrate the concepts underlying the project, including the mechanisms by which pollutants are remediated. For example: Which pollutants are remediated by gas discharge? Under what conditions will this occur? Is gas discharge always a desirable outcome? Are all pollutants affected? I am also concerned by the lack of preliminary data on the pollutants of concern in this region: what are the current concentrations? What are the target concentrations?
Rating	poor

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	The approach to be followed is also of concern, mostly due to a conspicuous lack of information. The study
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	site is "approx. 200 acres of wildlands land", but no information is given describing the site itself, its suitability for the project, or the site preparation needed to establish wetlands in this location. It does not appear that any of the federal, state or local permits for this project are in place, or that a wetlands design has been established. Although two treatments are proposed, no information is given about the nature of these treatments. Do they differ with respect to depth, flow rate, plants, etc? Although a list of parameters to be monitored is given, there is no information about the frequency of sampling or the analytical methods to be employed. And it appears that only the constructed wetlands will be monitored; there does not appear to be a plan to sample water not diverted to the wetlands as a control.
Rating	poor

Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	It is impossible to evaluate the likelihood of success for this project, because the approach is not fully documented. I am particularly concerned about the lack of permits, and the plan to spend the first year designing the wetlands and applying for permits. Isn't a wetland design required first, in order to apply for the permits? And what if the permits can't be obtained in the first 6 months, as planned?
Rating	poor

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

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Comments	A major part of this proposal concerns monitoring the effects of constructed wetlands on water quality. This section, describing the water monitoring (p. 13-14), seems fairly well-prepared, but still lacks key information about the pollutants to be measured, and the justification for the sampling plan (e.g. why only one composite sediment sample?) I also think that monitoring undiverted water is an important control, but this is not described. The sections on monitoring fish and insects are not well-described, but a reference is given. There are plans to compile, analyze and interpret data, and to develop recommendations.
Rating	good

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	This project has the potential to develop wetlands treatments to improve water quality in the lower Sacramento REiver, and to generate recommendations for management practices. It will also develop a project database with a GIS database-mapping system.
Rating	good

Additional Comments

Comments

Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

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Comments	A team with a diverse range of experience has been assembled for this project, including ecologists and engineers, who appear to have the qualifications needed to complete this project. However, very little detail is given for each team member, beyond their education, which makes it difficult to judge their specific capabilities with respect to this project. It would have been helpful to list publications where appropriate for each team member, and to list specific prior projects and their outcomes. The infrastructure necessary to accomplish the project appears to be available.
Rating	good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	The lack of specific details about the work to be done makes it difficult to assess the adequacy of the budget. For example, money has been budgeted for wetlands construction, but the wetlands design, number of treatments and replication have not been determined, so it is impossible to tell how this value was determined or if it is adequate for the proposed work. This is also true for the monitoring - without knowing the analyses to be done (which vary with respect to cost), how can this be properly budgeted?
Rating	fair

Overall

Provide a brief explanation of your summary rating.

Comments	THE idea behind this proposal - to develop wetlands to improve water quality - is interesting and relevant.
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Technical Review #1

	However, in general the proposal is poorly written and lacks important information to determine if the outcome will be successful. Specifically, the proposal does a poor job of describing the background science. It also lacks important details about the approach to be taken, including the current pollutant levels and targeted changes in these pollutants, the nature of the site to be used, and the description of the wetland designs to be used. The lack of these details makes it difficult to determine if the budget is appropriate, and to determine the feasibility of the project as a whole.
Rating	fair

Technical Review #2

proposal title: Conduct an Adaptive Management Experiment to Use Wetlands to Treat Colusa Basin Drain Water Entering the Yolo Bypass via the Knights Landing Ridge Cut

Review Form

Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

Comments	<p>The ideas promoted (water quality improvement, treatment wetlands, adaptive management) are timely and important. However, the applicant provides little justification for the proposed action beyond broad, general statements about the value and function of a wetland system as it relates to water quality, water supply, habitat, etc. The applicant also provides evidence that the proposed project may be premature. They reference an ongoing two-phase study to evaluate water quality within the Colusa Basin Drain (CBD). The first phase, not complete, is characterizing the water in the CBD and assessing the effects of CBD discharges on downstream users. The results of phase one will lead to phase two which considers alternatives for improving water quality for downstream users. The work proposed in this application is identified as one of the possible alternatives which might be considered in phase two. The potential exists that this alternative may not be selected as a preferred alternative for future evaluation.</p> <p>The reader is left feeling that this proposal was pieced together and not thought through. It lacks clear definition of the goal and objectives beyond broad, general statements regarding what the proposed activities hope to accomplish. This is further demonstrated in the the number of topics/keywords checked as applying to proposal. Lots of check marks,</p>
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Technical Review #2

	but failure to focus in on the key component of proposal identified in the Executive Summary (water quality). Interestingly enough, one of the items not checked, geomorphology, is later identified as a key component for designing the treatment system and evaluating its success.
Rating	fair

Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full-scale implementation project justified?

Comments	The justification and conceptual model are too broad and general. The primary project objective, water treatment, can be more accurately addressed in controlled, bench-scale studies to determine the most effective treatment wetland system to improve water quality. This research can be used to design wetland systems for testing in the field which will maximize water quality improvement at the lowest cost. I would direct the applicant to the approach used by Dr. John Rodgers at Clemson University.
Rating	fair

Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

Comments	The approach is feasible, but once again too many general objectives with no clearly defined goal as to how each will be achieved. Not certain how the results will add to the base of knowledge for the region or be useful to decision makers.
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Rating	fair
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Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success?
Is the scale of the project consistent with the objectives and within the grasp of authors?

Comments	Construction of treatment wetlands is feasible. But more importantly, can these systems be designed to provide useful data and information for researchers, managers, and policy makers to make decisions regarding future actions to improve water quality, habitat, etc. in the CBD region. The applicant does not demonstrate that careful consideration will be given given to designing and implementing a project to answer the stated project objectives and hypotheses.
Rating	fair

Monitoring

If applicable, is monitoring appropriately designed (pre–post comparisons; treatment–control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

Comments	The applicant provides general information regarding monitoring, interpretation of data, and reporting, but it is unclear how the monitoring will be conducted and the information analyzed. The text and approaches are poorly organized and the reader is left confused.
Rating	fair

Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

Comments	
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	A benefit of the proposed work could be a contribution to larger data management systems. Data can be collected using methods consistent with those developed for regional databases. Beyond this I am uncertain what products of value will come out of the proposed work.
Rating	fair

Additional Comments

Comments	<p>The proposed schedule for the project seems overly ambitious. Going by the Task ID list and Discussion of Engineering Design and Construction components, the applicant proposes to collect and review data, conduct pre-conceptual design meetings, prepare and review draft conceptual design plans, and prepare and distribute for review and incorporate comments for each of the 30%, 75% and 100% design plans within the first three months of the project. This is an ambitious schedule.</p> <p>A better understanding of the area which would be impacted from construction of the treatment cells would have been useful. Are these areas of existing rice paddies and agricultural field, wetlands?</p> <p>A more detailed discussion of the treatment cell design and configurations to understand how the applicant planned to assess designs and use the results to improve water quality at the lowest cost would have been helpful.</p>
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Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

Comments	I believe that the authors are qualified to conduct the kinds of work proposed. However, based on the
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	proposal as it is written and presented, I am not certain that the team is qualified to effectively and efficiently implement the proposed project. The way the proposal is written suggests that the team will figure out how do do the work after it receives funding. I find this unacceptable. You can answer some of the questions posed in the proposal (focus on water quality) using smaller, pilot-scale studies. Then you can apply an adaptiver management approach to the project.
Rating	good

Budget

Is the budget reasonable and adequate for the work proposed?

Comments	Given that much of the proposed work identified under the various tasks is defined in general terms it is difficult to determine whether the budget is reasonable and adequate for the work proposed.
Rating	fair

Overall

Provide a brief explanation of your summary rating.

Comments	The ideas promoted (water quality improvement, treatment wetlands, adaptive management) in this proposal are timely and important. However, the applicant provides little justification for the proposed work beyond broad, general statements about the value and function of a wetland system as it relates to water quality, water supply, habitat, etc. It lacks clear definition of the goal and objectives beyond broad, general statements regarding what the proposed activities hope to accomplish. The reader is left feeling that this proposal was pieced together and not thought through.
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Technical Review #2

	I have no doubt that the authors are capable of designing and implementing experiments that will be valuable to CALFED and to find ways to improve water quality in the CDB region. However, this proposal short of demonstrating an effective adaptive management approach to use wetlands to treat water.
Rating	fair

